

Remarks

Thorough examination by the Examiner is noted and appreciated.

The claims have been amended to overcome Examiners rejections, as required by Examiner, and to further clarify Applicants invention.

Support for the amended claims is found in the original claims and the Specification.

No new matter has been added.

For example, support for the amendments in claims 1 and 9 are found in paragraphs 0020 and 0038 of the Specification.

"In addition to receiving CMP wastewater from the CMP wastewater collection tank and BG (backside grinding) wastewater from the BG wastewater collection tank, the reaction tank may further receive backwash wastewater from a BW (backwash) wastewater collection tank. **The coagulant polymer in the reaction tank bridges or cross-links silicon particles in the BG wastewater and the BW wastewater.** This significantly accelerates the sedimentation process and expedites separation of the polymer-bound particles from the

wastewater in the clarifier or clarifiers, as well as **significantly reduces the quantity of coagulant polymer necessary for sedimentation.**"

"The coagulant polymer 60 is added to the combined wastewater in the reaction tank 58, where the coagulant polymer 60 combines with the silica slurry particles, silicon particles and other particles in the combined wastewater **to precipitate or sediment the particles out of solution.** Preferably, the coagulant polymer 60 is FSC-835, which is known by those skilled in the art as a potent coagulator of slurry particles in CMP wastewater. It will be appreciated by those skilled in the art that, due to the negative charges on the particles in the wastewater, the positively-charged FSC-835 coagulant polymer 60 bridges or cross-links the wastewater particles, forming micro-floc nuclei which attract additional wastewater particles and form macro-floc coagulant structures. This phenomenon substantially accelerates the wastewater particle sedimentation process in the reaction tank 58, while substantially reducing the quantity of coagulant polymer 60 necessary to effectively remove or precipitate the particles from the wastewater."

New Matter

Examiner asserts that Applicants has attempted to add new matter in the amendment filed 9/22/05, specifically referring to "it will be appreciated ...coagulant polymer added" lacks clear antecedent basis in the original disclosure.

Examiner has not specifically explained what the new matter is or supported a claim that one of ordinary skill would not recognize what Applicants have described with respect to their invention.

See for example, the beginning of paragraph 0040, where Applicants discuss a jar test to determine the appropriate amount of coagulant polymer to be added:

"The quantities of the coagulant polymer 60 and coagulant polymer 62 which are effective to adequately bind and precipitate the slurry and other particles out of solution in the combined wastewater can be determined using a wastewater sample jar test, for example."

Examiner has clearly not met the burden of establishing a *prima facie* case that Applicants have added new matter.

Nevertheless, in an effort to further examination of Applicants invention on the merits, Applicants have now submitted a newly amended paragraph 0040, removing the language that Examiner has referred to, as required by Examiner.

Claim Rejections under 35 USC 112

1. Claims 1-16 stand rejected under 35 USC Section 112, first paragraph, as failing to comply with the written description requirement. Examiner asserts that the language "equipped to add an additive" in claims 1 and 9 and in claim 9 "composite particles comprising first and second particles" and "said outlet portion equipped to add a second additive" lack clear antecedent basis in the Specification as originally filed, and appear to be drawn to new matter.

Applicants point out what the relevant considerations under 35 USC Section 112, first paragraph:

"[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom." *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968)

It is now well accepted that a satisfactory description may be in the claims or any other portion of the originally filed specification.

See MPEP, 8th Ed, Section 2163 (I)

An applicant shows possession of the claimed invention by describing the claimed invention with all of its limitations using such descriptive means as **words, structures, figures, diagrams, and formulas that fully set forth the claimed invention.** *Lockwood v.*

American Airlines, Inc., 107 F.3d 1565, 1572,
41 USPQ2d 1961, 1966 (Fed. Cir. 1997).

While there is no *in haec verba* requirement, newly added claim limitations must be supported in the specification through express, implicit, or inherent disclosure.

See MPEP, 8th Ed, Section 2163 (I) (B)

The fundamental factual inquiry is whether the **specification conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed.** See, e.g., *Vas-Cath, Inc.*, 935 F.2d at 1563-64, 19 USPQ2d at 1117.

Possession may be shown in many ways. For example, possession may be shown by describing an actual reduction to practice of the claimed invention. Possession may also be shown by a clear depiction of the invention in detailed drawings or in structural chemical formulas which permit a person skilled in the art to clearly recognize that applicant had possession of the claimed invention. An adequate written description of the invention may be shown by any description of sufficient, relevant, identifying characteristics so long as a person skilled in the art would recognize that the inventor had possession of the claimed invention. See, e.g., *Purdue Pharma L.P. v. Faulding Inc.*, 230 F.3d 1320, 1323, 56 USPQ2d 1481, 1483 (Fed. Cir. 2000)

Applicants reproduce portions of the Specification with respect to "equipped to add an additive":

See paragraphs 0033 and 0038 and Figure 2:

"As hereinafter described, the CMP wastewater 43, along with the BG wastewater 47 and/or the BW wastewater 51, is distributed to the reaction tank 58, where a coagulant polymer 60, such as FSC-835, for example, **binds to slurry particles** in the wastewater and **precipitates the particles** out of solution. Chemical adjustments, such as pH adjustments, may also be made to the wastewater in the reaction tank 58. **An outlet conduit 59 extends from the reaction tank 58, and a second coagulant polymer 62, such as EA-630, for example, is introduced into the outlet conduit 59, to bind slurry particles which remain unbound to the coagulant polymer 60 in the wastewater.**"

"The coagulant polymer 60 is added to the combined wastewater in the reaction tank 58, where the coagulant polymer 60 combines with the silica slurry particles, silicon particles and other particles in the combined wastewater to precipitate or sediment the particles out of solution. Preferably, the coagulant polymer 60 is FSC-835, which is known by those skilled in the art as a potent coagulator of slurry particles in CMP wastewater. It will be appreciated by those skilled in the art that, due to the negative charges on the particles in the wastewater, the positively-charged FSC-835 coagulant polymer 60 **bridges or cross-links the wastewater particles**, forming micro-floc nuclei which attract additional wastewater particles and form macro-floc coagulant structures. This phenomenon substantially accelerates the wastewater particle sedimentation process in the reaction tank 58, while substantially reducing the quantity of coagulant polymer 60 necessary to effectively remove or precipitate the particles from

the wastewater."

Thus one of ordinary skill would readily appreciate that Applicant has possession of the claimed invention as shown in Figure 2 including items 60 and 62 where it is shown that explicitly that the reaction tank and the outlet conduit include structure for adding coagulant polymer additive as shown in items 60 and 62 and as claimed in claims 1 and 9.

Nevertheless, in an effort to further prosecution on the merits, claims 1 and 9 have been amended to recite the reaction tank and the outlet portion as "configured" rather than "equipped" to add the first and second additives as clearly shown in Figure 2, and which would readily be apparent to one of ordinary skill in the art as to what Applicants invention describes.

With respect to "composite particles comprising first and second particles", and "said outlet portion equipped to add a second additive" in claim 9 see Figure 2, item 62 and e.g. paragraphs 0027, and 0033:

"In one embodiment, BW (backwash) wastewater from a BW wastewater collection tank may be distributed into the reaction tank along with the CMP wastewater and BG wastewater. **The coagulant polymer in the reaction tank bridges or cross-links silicon and other particles in the BG wastewater and the BW wastewater, forming a flocculation nucleus that attracts additional particles.** This nucleation phenomenon significantly accelerates the sedimentation process, both expediting separation of the particles from the wastewater in the clarifier or clarifiers and significantly reducing the quantity of coagulant polymer necessary for sedimentation."

"As hereinafter described, the CMP wastewater 43, along with the BG wastewater 47 and/or the BW wastewater 51, is distributed to the reaction tank 58, where a coagulant polymer 60, such as FSC-835, for example, **binds to slurry particles in the wastewater and precipitates the particles out of solution.** Chemical adjustments, such as pH adjustments, may also be made to the wastewater in the reaction tank 58. **An outlet conduit 59 extends from the reaction tank 58, and a second coagulant polymer 62, such as EA-630, for example, is introduced into the outlet conduit 59, to bind slurry particles which remain unbound to the coagulant polymer 60 in the wastewater.**"

Thus, it is clear that one of ordinary skill would understand Applicants claimed first second and third particles as well as composite particles as Applicants have clearly disclosed and claimed in claims 1 and 9 i.e., forming **composite or third**

particles (precipitates) from first and second particles:

Thus one of ordinary skill would understand that the first and second particles in the original claims and disclosure **precipitate out (bind to the coagulant polymer)"** to create a composite particle or a third particle, as clearly explained in Applicants Specification.

An applicant shows possession of the claimed invention by describing the claimed invention with all of its limitations using such descriptive means as **words, structures, figures, diagrams, and formulas that fully set forth the claimed invention.** *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997).

While there is no *in haec verba* requirement, newly added claim limitations must be supported in the specification through **express, implicit, or inherent disclosure.**

See MPEP, 8th Ed, Section 2163 (I) (B)

Nevertheless, in an effort to further prosecution on the merits, Applicants have amended claims 1 and 9 in an effort to further prosecution on the merits.

Claim Rejections under 35 USC 103

2. Claims 1-16 stand rejected under 35 USC Section 103(a) as being unpatentable over Rice (US 2,640, 807) in view of Applicants alleged admitted prior art.

Rice discloses a system for treating **acid and cyanide waste waters** (liquids) (col 1, lines 1-30; e.g., claim 1). Rice discloses conditioning tanks for maintaining a **large body of sludge in the conditioning tanks bottom portion for passing the liquid waste effluent through** (col 2, lines 4-14).

In one embodiment, the wastewater treatment system of Rice passes a first wastewater (cyanide) from a first conditioning tank **through the sludge** to a second conditioning tank and subsequently **through the sludge** to a settling tank (col 2, lines 15-21; Figures IV and V). In another embodiment, wastewater is passed from each conditioning tank to the settling tank (see Figure III).

In either embodiment, **lime and/or chlorine** are added (item 29 and 47) to the wastewater supply line **prior to** the wastewater **reaching a respective conditioning tank**. Each of the conditioning tanks and settling tanks include downcomers (e.g.,

item 55 and 74 Figure 3) **to enhance liquid phase reactions** (col 6, lines 63-70). The wastewater is mixed with sludge at the bottom of the tank. The reacted waste water in the conditioning tanks **overflows** as it **builds up over treatment time** (i.e., a **continuous flow** of wastewater; **continuous flow reactor**) into an annular trough in the conditioning tank prior passing as effluent to the settling tank (col 6, lines 70-75). The waste water from the first conditioning tank and the second conditioning tank then passes into separate concentrically positioned downcomers in the settling tank (col 7, lines 50-55; lines 60-65) as part of a **continuous flow** reaction.

Thus, Rice fails to teach several aspects of Applicants disclosed and claimed invention.

Among other elements of Applicants disclosed and claimed invention **Rice does not disclose a batch reactor system:**

"A system for batch treating semiconductor manufacturing process wastewater to reduce an amount of precipitate forming additive required"

Rather, Rice teaches a **continuous flow reactor system for treating liquid waste**, which an artist of ordinary skill clearly understands in very different and works by a different principle of operation from a **batch reactor system**.

Rice also fails to teach the following elements of Applicants disclosed and claimed invention:

a first collection tank for receiving a first wastewater **comprising first particles;**

a second collection tank for receiving a second wastewater **comprising second particles;**

a **batch reaction tank** provided in fluid communication with said first collection tank and said second collection tank, said batch reaction tank for **receiving and sedimenting particles from a batch of wastewater without overflow of said wastewater** comprising the first wastewater and the second wastewater wherein said **reaction tank is configured to add an additive to said batch to form a precipitate comprising said first and second particles for sedimentation;** and

at least one clarifier provided in fluid communication with said reaction tank for **separating said precipitate** from said batch of wastewater.

Nowhere does Rice disclose or suggest **forming precipitates, removing particles or precipitates from wastewater, or adding and additive that forms precipitates in a batch reactor without overflow.** Rather Rice discloses the use of **downcomers in both the conditioning tanks and the settling tanks for aiding in liquid phase reactions in a continuous flow reactor where the conditioning tank includes downcomers and annular structure for allowing overflow of the wastewater which then travels to settling tanks to remove the sludge introduced in the conditioning tank.**

As such, Rice further does not disclose:

"at least **one clarifier provided in fluid communication with said reaction tank** for separating said precipitate from said batch of wastewater";

In Applicants disclosure, Applicants disclose a prior art process for treating a single wastewater source in a semiconductor manufacturing process (see pages 6 and 7 of Applicants Specification, and Figure 1). Applicants disclose a single collection tank to feed a holding tank which feeds a reaction tank. Nowhere do Applicants disclose or suggest Applicants disclosed and claimed invention including a first collection tank comprising first particles and a second collection tank comprising second particles or disclose or suggest a solution to the problem that Applicants have recognized and solved by their disclosed and claimed invention:

"A system for batch treating semiconductor manufacturing process wastewater to reduce an amount of precipitate forming additive required"

Moreover, there appears to be no motivation to combine the teachings of Rice and Applicants alleged admitted prior art, **other than Applicants disclosure. The liquid phase continuous flow reactors of Rice which includes sludge in the bottom of the conditioning tank** through which the liquid wastewater is forced

to pass and an **annular overflow portion** to collect the treated waste water **prior to passing** to the settling tank to **remove any remaining sludge**, works by a different principal of operation than the disclosed **batch reaction tank** of Applicants for carrying out **sedimentation** of precipitates formed from particles in the wastewater in Applicants discussion of the prior art, **and could not accomplish Applicants disclosed and claimed process.**

Examiner argues that Applicants have not presented factual evidence to support the argument that Rice works by a different principle of operation i.e., **liquid phase continuous flow reactor** of Rice versus **batch reactor precipitation to remove particles** of Applicants disclosed and claimed invention.

It is respectfully noted by Applicants that Examiner has the burden establishing a *prima facie* case, and that Applicants have do not have the burden of submitting factual evidence with respect to what one of ordinary skill would appreciate (i.e., liquid phase continuous flow reactor versus **batch precipitation reactor to remove particles**) especially where the elements of Applicants disclosed and claimed invention have not been shown in the prior art.

Examiner also argues that Applicants **do not exclude downcomers and annular overflow portions** of Rice from the instant claims. Applicants respectfully note that **downcomers and overflow portions are commonly used in continuous flow reactors** as taught by Rice, and such structures are inconsistent with the principle of operation of **batch reactors** as one of ordinary skill in the art would readily recognize.

Nevertheless, even assuming *arguendo* a proper motivation for combining the teachings Rice and Applicants discussion of the prior art, which Applicants do not concede, such combination does not produce Applicants disclosed and claimed invention.

Finally, the prior art reference (or references when combined) **must teach or suggest all the claim limitations**. The teaching or suggestion to make the claimed combination and the reasonable expectation of success **must both be found in the prior art, and not based on applicant's disclosure**. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

"The prior art must provide a motivation or reason for the

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worker in the art, without the benefit of appellant's specification, to make the necessary changes in the reference device." *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984).

"If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." *In re Ratti*, 270 F.2d 810, 123, USPQ 349 (CCPA 1959).

Conclusion

Since Rice alone, or in combination with Applicants disclosure, does not produce Applicants disclosed and claimed invention, neither has a *prima facie* case of obviousness been made out with respect to Applicants independent and dependent claims.

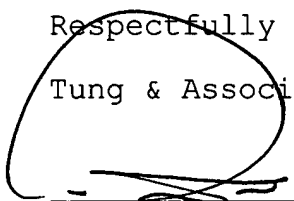
Based on the foregoing, Applicants respectfully submit that Applicants Claims are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

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In the event that the present invention as claimed is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

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